1. Determine the appropriate model for the graph of points below.
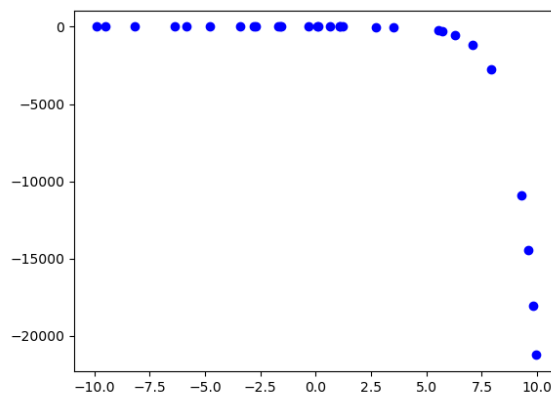

A. Non-linear Power model

B. Logarithmic model

C. Linear model

D. Exponential model

E. None of the above

2. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 28 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

A. About 3 percent

B. About 13 percent

C. About 9 percent

D. About 14 percent

E. None of the above

3. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

Pringles wants to add 34 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?
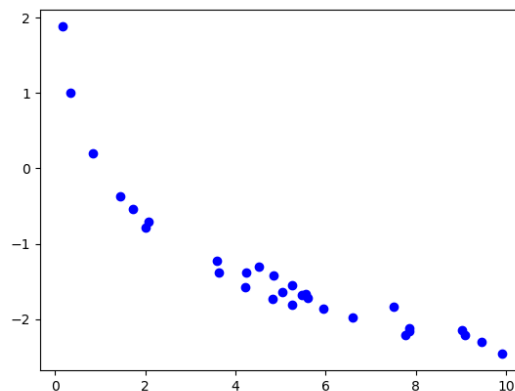
A. About 11 percent

B. About 16 percent

C. About 17 percent

D. About 10 percent

E. None of the above

4. Determine the appropriate model for the graph of points below.

A. Non-linear Power model

B. Exponential model

C. Linear model

D. Logarithmic model

E. None of the above

5. Solve the modeling problem below, if possible.

   A new virus is spreading throughout the world. There were initially 3 many cases reported, but the number of confirmed cases has doubled every 5 days. How long will it be until there are at least 10000 confirmed cases?

   A. About 26 days

   B. About 41 days

   C. About 59 days

   D. About 22 days

   E. There is not enough information to solve the problem.

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6. Solve the modeling problem below, if possible.

   In CHM2045L, Brittany created a 17 liter 33 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 19 percent and 45 percent solutions, what was the amount she used of the 19 percent solution?

   A. $7.85 liters$

   B. $9.15 liters$

   C. $8.50 liters$

   D. $8.43 liters$

   E. There is not enough information to solve the problem.

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7. Solve the modeling problem below, if possible.

   In CHM2045L, Brittany created a 22 liter 19 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 17

percent and 40 percent solutions, what was the amount she used of the 17 percent solution?

   A. $1.91 liters$

   B. $11.00 liters$

   C. $16.54 liters$

   D. $20.09 liters$

   E. There is not enough information to solve the problem.

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8. Using the scenario below, model the population of bacteria α in terms of the number of minutes, t that pass. Then, choose the correct approximate *(rounded to the nearest minute)* replication rate of bacteria-α.

   A newly discovered bacteria, α, is being examined in a lab. The lab started with a petri dish of 2 bacteria-α. After 3 hours, the petri dish has 855 bacteria-α. Based on similar bacteria, the lab believes bacteria-α doubles after some undetermined number of minutes.

   A. About 20 minutes

   B. About 221 minutes

   C. About 36 minutes

   D. About 123 minutes

   E. None of the above

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9. For the scenario below, model the rate of vibration (cm/s) of the string in terms of the length of the string. Then determine the variation constant k of the model (if possible). The constant should be in terms of cm and s.

   The rate of vibration of a string under constant tension varies based on the type of string and the length of the string. The rate of vibration of string ω decreases as the cube length of the string increases. For example, when string ω is 2 mm long, the rate of vibration is 21 cm/s.

A. $k = 2625.00$

B. $k = 0.17$

C. $k = 168.00$

D. $k = 2.62$

E. None of the above.

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10. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 8 many cases reported, but the number of confirmed cases has quadrupled every 1 days. How long will it be until there are at least 1000000 confirmed cases?

A. About 9 days

B. About 12 days

C. About 5 days

D. About 4 days

E. There is not enough information to solve the problem.